



# HA Series Hot Air Dryers

Part Number: 882.00222.00  
Bulletin Number: DH1-650  
Effective: 11/01/05

Write Down Your Serial Numbers Here For Future Reference:

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We are committed to a continuing program of product improvement.  
Specifications, appearance, and dimensions described in this manual are subject to change without notice.

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## **Please note that our address and phone information has changed. Please reference this page for updated contact information.**

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These manuals are obsolete and are provided only for their technical information, data and capacities. Portions of these manuals detailing procedures or precautions in the operation, inspection, maintenance and repair of the products may be inadequate, inaccurate, and/or incomplete and shouldn't be relied upon. Please contact the ACS Group for more current information about these manuals and their warnings and precautions.

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The ACS Customer Service Group will provide your company with genuine OEM quality parts manufactured to engineering design specifications, which will maximize your equipment's performance and efficiency. To assist in expediting your phone or fax order, please have the model and serial number of your unit when you contact us. A customer replacement parts list is included in this manual for your convenience. ACS welcomes inquiries on all your parts needs and is dedicated to providing excellent customer service.

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- North, Central and South America, 8am – 5pm CST +1 (800) 483-3919 for drying, conveying, heating and cooling and automation. For size reduction: +1 (800) 229-2919.  
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#### **For assistance with your sales or system contracting needs please Call:**

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# Shipping Info

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## ***Unpacking and Inspection***

You should inspect your dryer for possible shipping damage.

Thoroughly check the equipment for any damage that might have occurred in transit, such as broken or loose wiring and components, loose hardware and mounting screws, etc.

## ***In the Event of Shipping Damage***

According to the contract terms and conditions of the Carrier, the responsibility of the Shipper ends at the time and place of shipment.

Notify the transportation company's local agent if you discover damage.

Hold the damaged goods and packing material for the examining agent's inspection. **Do not return any goods before the transportation company's inspection and authorization.**

File a claim with the transportation company. Substantiate the claim by referring to the agent's report. A certified copy of our invoice is available upon request. The original Bill of Lading is attached to our original invoice. If the shipment was prepaid, write us for a receipted transportation bill.

Advise customer service regarding your wish for assistance and to obtain an RMA (return material authorization) number.

## ***If the Shipment is Not Complete***

Check the packing list as back-ordered items are noted on the packing list. You should have:

- Hot Air Dryer
- Bill of lading
- Packing list
- Operating and Installation packet
- Electrical schematic and panel layout drawings
- Component instruction manuals

Re-inspect the container and packing material to see if you missed any smaller items during unpacking.

## ***If the Shipment is Not Correct***

If the shipment is not what you ordered, **contact the shipping department immediately**. For shipments in the United States and Canada, call 1 (800) 229-2919; for all other countries, call our international desk at (508) 399-6400. Have the order number and item number available. *Hold the items until you receive shipping instructions.*

## ***Returns***

Do not return any damaged or incorrect items until you receive shipping instructions from the shipping department.

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# Chapter 1: Safety

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## 1-1 How to Use This Manual

Use this manual as a guide and reference for installing, operating, and maintaining your dryer. The purpose is to assist you in applying efficient, proven techniques that enhance equipment productivity.

This manual covers only light corrective maintenance. No other maintenance should be undertaken without first contacting a service engineer.

The Functional Description section outlines models covered, standard features, and safety features. Additional sections within the manual provide instructions for installation, pre-operational procedures, operation, preventive maintenance, and corrective maintenance.

The Installation chapter includes required data for receiving, unpacking, inspecting, and setup of the dryer. We can also provide the assistance of a factory-trained technician to help train your operator(s) for a nominal charge. This section includes instructions, checks, and adjustments that should be followed before commencing with operation of the dryer. These instructions are intended to supplement standard shop procedures performed at shift, daily, and weekly intervals.

The Operation chapter includes a description of electrical and mechanical controls, in addition to information for operating the dryer safely and efficiently.

The Maintenance chapter is intended to serve as a source of detailed assembly and disassembly instructions for those areas of the equipment requiring service. Preventive maintenance sections are included to ensure that your dryer provides excellent, long service.

The Troubleshooting chapter serves as a guide for identification of most common problems. Potential problems are listed, along with possible causes and related solutions.

The Appendix contains technical specifications, drawings, schematics, parts lists, and available options. A spare parts list with part numbers specific to your machine is provided with your shipping paperwork package. Refer to this section for a listing of spare parts for purchase. Have your serial number and model number ready when ordering.

### **Safety Symbols Used in this Manual**

The following safety alert symbols are used to alert you to potential personal injury hazards. Obey all safety messages that follow these symbols to avoid possible injury or death.

**DANGER!** *DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.*

**WARNING!** *WARNING indicates a potentially hazardous situation or practice that, if not avoided, could result in death or serious injury.*

**Caution!** *CAUTION indicates a potentially hazardous situation or practice that, if not avoided, may result in minor or moderate injury or in property damage.*

## 1-2 Responsibility

These machines are constructed for maximum operator safety when used under standard operating conditions and when recommended instructions are followed in the maintenance and operation of the machine.

All personnel engaged in the use of the machine should become familiar with its operation as described in this manual.

Proper operation of the machine promotes safety for the operator and all workers in its vicinity.

Becoming familiar with materials, inspection, speed limitations, screens, and guard maintenance and total user responsibility will assist you in learning potential areas in need of observation for danger.

Each individual must take responsibility for observing the prescribed safety rules as outlined. All caution, warning and danger signs must be observed and obeyed. All actual or potential danger areas must be reported to your immediate supervisor.

## 1-3 Warnings and Precautions

Our dryers are designed to provide safe and reliable operation when installed and operated within design specifications, following national and local safety codes.

To avoid possible personal injury or equipment damage when installing, operating, or maintaining this dryer, use good judgment and follow these safe practices:

- Follow all **SAFETY CODES**.
- Wear **SAFETY GLASSES** and **WORK GLOVES**.
- Disconnect and/or lock out power before servicing or maintaining the hot air dryers
- Use care when **LOADING, UNLOADING, RIGGING, or MOVING** this equipment.
- Operate this equipment with design specifications.
- OPEN, TAG, and LOCK ALL DISCONNECTS** before working on equipment.  
You should remove the fuses and carry them with you.
- Make sure the hot air dryers and components are properly **GROUNDDED** before you switch on power.
- Do not jump or bypass any electrical safety control.
- Do not restore power until you remove all tools, test equipment, etc. and the hot air dryers and related equipment are fully reassembled.
- Only **PROPERLY TRAINED** personnel familiar with the information in this manual should work on this equipment.

# Chapter 2: Functional Description

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## 2-1 Models Covered in This Manual

This manual provides all necessary information for installing, operating, and maintaining HA/SHA/CHA Series Hot Air Dryers and Accessories covering the 60 to 1500 models. The dryer number designation represents air flow capacity.

**Figure 1: Hot Air Dryer Air Flow Capacity**

Model Number	CFM	CHM
60	60	100
150	150	250
225	260	450
450	525	900
1000	1000	1700
1250	1250	2100
1500	1500	2550

## 2-2 Equipment Function

Hot air dryers are designed to deliver heated air to a drying hopper to drive moisture of the surface of plastic pellets. Hot air dryers are sized to meet the specific requirements stated by the purchaser at the time of purchase. Hot air dryers are used to deliver between 60 and 1500 cfm (see above figure) at temperatures up to 300° F (148° C).

## 2-3 Necessary Documents

The documents listed below are necessary for the operation, installation, and maintenance of hot air dryers. Additional copies are available from the manufacturer. **Make sure that the appropriate personnel are familiar with these documents:**

- This manual.
- The schematic and connection diagram in the control enclosure.
- The operation and installation manuals for accessories and options selected by the customer.
- The Customer Parts List included in the information packet.

## 2-4 Standard Features

- Regeneratitve (60/150/260 cfm) or centrifugal blower (450/1000/1250/1500 cfm)
- NEMA 1, standard 460/3/60 control panel
- Built-in high temperature safety
- Set point process temperature control to 300° F (149° C)
- One 12 foot (3.6 m) length of high temperature dryer hose
- Inlet air filter

- “Cabinet style” enclosure with casters on 60/150/225/450 cfm models
- Electrical non-fused disconnect

## 2-5 Optional Features

Options are available to match your hot air dryer with your specific drying requirements.

- Heater burnout indicators* can warn the operator of a process heater failure.
- Casters* increase the portability of the unit.
- Special voltages* are available to match the power supply of your facility.

**Figure 2: Hot Air Dryer Specifications**

Model	Horsepower (hp)	Heater (kW)	Amperage Draw			Shipping Weight	
			230V	460V	575V	Lbs.	Kg.
60	1	7	24	18	14	225	102
150	2.5	12	40	25	21.3	275	125
225	5	20	N/A	38.6	32	300	136
450	3	30	N/A	48.5	40	650	295
1000	5	48	N/A	104	60	1180	535
1250	5	60	N/A	114	96	1275	578
1500	7.5	75	N/A	114	96	1350	612

# Chapter 3: Installation

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## 3-1 Work Rules

The installation, operation, and maintenance of this equipment must be conducted in accordance with applicable work and safety codes for the installation location. This may include, but is not limited to, OSHA, NEC, CSA, and any other local, national, and international regulations.

- Read and follow these operating instructions when installing, operating, and maintaining this equipment. If the instructions become damaged or unreadable, additional copies are available from the manufacturer.
- Only qualified personnel familiar with this equipment should work on or with this dryer.
- Work with approved tools and devices

***Caution!*** *Disconnect the electricity before maintenance or service!*

- If the dryer is installed with a power cord that can be unplugged, unplug it. If the dryer is permanently wired to a power main, a fused power disconnect must be installed to allow the disconnect to be locked in the OFF position. Open and lock the disconnect installed in the control enclosure. It is advisable to remove the disconnect fuses and carry them with you.

## 3-2 Installation Location Considerations

Your hot air dryer was designed to be mounted near the processing machine and connected to the drying hopper with the high temperature, flexible hose provided with the unit.

***Note:*** *Make sure to allow enough dryer hose to compensate for any movement of the drying hopper.*

### ***Hose Connection***

- a. Remove the shipping cap from the air heater can outlet.
- b. Connect one end of the dryer hose to the outlet with a hose clamp.
- c. Attach the other end of the hose to the inlet of the drying hipper and secure with a hose clamp.

## 3-3 Assembling the Air Diffusor/Air Trap

On existing machine hoppers, it may be possible to install the optional air diffusor assembly if the machine hopper is the proper size. The hopper must be round and have sufficient capacity for the proper material residence time. Consult factory for drying times required on other materials.

1. Position the air diffuser so that it rests on the support arms of the machine hopper.
2. Adjust the support arms to allow two to four (2 to 4) inches (51 mm to 102 mm) from the diffusor screen to the hopper wall and keep the space constant around the air diffusor.
3. Cut the high-temperature flexible hose to suit the hopper depth. Centrally locate the hose over the hopper discharge throat. Make sure that the screen diffusor does not get tilted out of position. Secure the hose with the clamps provided.

4. Cut a 14-inch (356 mm) diameter opening in the existing machine hopper cover to install the air trap assembly.
5. Drill eight (8) 13/32" holes on 15 3/4" diameter bolt circle in the cover to mount the assembly. Bolt the assembly to the cover.

**Important!**

**Make sure that the fill cover is left on the drying hopper or air diffusor/air trap assembly at all times to prevent contamination of the material and ensure proper drying.**

ACS offers a complete line of automatic loading equipment to automatically load the drying hopper. Contact your sales representative for drying hopper loading applications.

### 3-4 Making Electrical Connections

- Fulfill all national, state, and local safety and electrical code requirements.
- Only a **qualified electrician** should make electrical connections.
- Make sure all electrical connections are tight.**

**Caution!** *Disconnect the electricity before maintenance or service!*

- If the dryer is installed with a power cord that can be unplugged, unplug it. If the dryer is permanently wired to a power main, a fused power disconnect must be installed to allow the disconnect to be locked in the OFF position. The above should be performed in accordance with applicable safety regulations.

#### **Power Drop**

Refer to the serial number plate for voltage and phase requirements. The power drop must include a ground wire. Installation must conform to NEC, CSA, and/or other electrical safety standards in force at the installation site.

#### **Blower Motor Rotation**

Most ACS dryers require a three (3)-phase power drop. When the drop is wired correctly, air flows out of the delivery outlet. Incorrect wiring of the three (3) power leads will cause backward rotation of the blower.

**Important!**

**If the blower is turning backwards, *do not* reverse the wires at the motor starters. Instead, reverse the two (2) wires at the wire drop.**

# Chapter 4: Startup and Operation

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## 4-1 Introduction

Air is drawn through a permanent electrostatic, washable filter, by a centrifugal blower. The air is blown through the process heater box where it is heated to the appropriate drying temperature. The temperature is controlled by a solid-state temperature controller which includes a built-in process air safety to prevent material meltdown. Heated air is then directed either through an air diffusor assembly in an existing machine hopper or a drying hopper. These hopper combinations provide even air distribution through materials for maximum drying efficiency. The moisture-laden air is then discharged into the atmosphere.

## 4-2 Pre-Startup Checklist

Before you start the dryer, check the following:

- Make sure that all hose connections are correct.
- Make sure that the air filter is in place.
- Make sure that all electrical connections are complete and the control enclosure door is closed.

## 4-3 Starting the Dryer

1. Hot air dryers feature a disconnect switch on the control cabinet. This switch must be placed ON and the ON/OFF switch placed ON to operate the dryer. When the ON/OFF switch is in the ON position, a power lamp will light.
2. Set the process air temperature control knob to the desired temperature and an amber Air Heat lamp will light when the heaters are on.
3. Operation of the dryer is completely automatic requiring no further attention once the unit is running and the temperature is set.

*Note: A built-in safety will open if a high temperature condition exists. If this should happen, both indicating lamps and the unit will shut off. Motor overload and control circuit protection are provided in the control cabinet.*

## 4-4 Shutting Down the Dryer

To shut down the hot air dryer:

1. Turn the ON/OFF switch to the OFF position.
2. Turn the disconnect handle to the OFF position.

## 4-5 Drying Non-Hygroscopic Materials

Non-hygroscopic materials retain surface moisture which has to be removed to ensure high product quality. Different materials require different times and temperatures to thoroughly dry. Recommended drying rates are listed in the figure below.

Figure 3: Temperature Guide and Drying Rate Chart for Non-Hygroscopic Materials

Non-Hygroscopic Materials	Residence Time (hrs)	Material Drying		Maximum Throughput						
		(°F)	(°C)	60 cfm	150 cfm	225 cfm	450 cfm	1000 cfm	1250 cfm	1500 cfm
Acetal	1.5	200-220	93-104	30	75	112.5	225	500	625	750
Polypropylene	1.5	220	104	30	75	1125.	225	500	625	750
Styrene	1.5	185	85	30	75	112.5	225	500	625	750
Vinyls	1.5	200	93	30	75	112.5	225	500	625	750
Polyethylene	1.5	185	93	30	75	112.5	225	500	625	750

*Note: For materials with up to 2% surface moisture. For materials with higher moisture content, please contact Engineering.*

# Chapter 5: Maintenance

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## 5-1 Maintaining Blower Motors

### **Models 60, 150, and 450**

The Regenair Centrifugal Blowers are virtually maintenance-free with prelubricated bearings.

#### **Model 1000, 1250, & 1500**

The motor is self-lubricated for normal bearing life. For longest life, relubricate bearings annually. Remove drain plug. Inject good quality NLGI Grade 2 grease into fill hole. Run motor to discharge excess grease. Replace plug. Do not overgrease.

## 5-2 Cleaning the Air Filters

### **Models 60 and 150**

The air filters slide out for cleaning at regular intervals depending on plan operating conditions. Wash the filter in soap and water (not above 190 F/87 C). No oiling or other treatment is necessary for this filter.

## 5-3 Cleaning the Cartridge Filters

### **Models 450 and 1500**

These units are equipped with a cartridge type air filter. It must be inspected and cleaned regularly depending on operating conditions. Remove the cover from the canister by loosening the band clamp arrangement. Take out the filter cartridge and shake or vacuum clean. Replace the cartridge if it cannot be cleaned. Remove all loose material from the canister. Reassemble.

***Caution!*** *Do not run dryer without filter in place!*

## 5-4 Adjusting the Temperature Safety Set Point

The temperature control on the hot air dryer has two set points.

- The *process temperature set point* is adjusted by turning the large numbered dial on the face of the unit.
- The *safety set point* is set automatically as an interval above the process temperature set point.

If the process air temperature exceeds the safety point set point level, the dryer will shut down. The safety set point interval is factory-adjusted, but under certain circumstances, it may be necessary to readjust. Readjust the safety set point using the following procedure:

1. Determine the number of degrees of separation you want between the process temperature set point and the safety set point. (Example: 25° F)
2. Stabilize the process air temperature at a known value. (Example: 200° F)
3. Locate the safety set point separation adjustment. On the controls manufactured by United Electric, the safety set point is trimpot 3 behind the faceplate panel. High alarm adjustment for the West controller is located on the upper left hand corner on the inside of the faceplate.

4. Quickly lower the process temperature set point by the number of degrees of separation you want. (Example: 25°, from 200° to 175°)
5. Turn the safety set point separation adjustment until the second pilot light on the controller changes state. The second pilot light will illuminate just below the safety set point.

## 5-5 Replacing the Heater Element

The best quality industrial heaters are used in the air heater compartment. Because most dryers are working 24 hours a day, everyday that your processing machines are operating, these heaters may need occasional replacement.

1. Disconnect the electrical power source.
2. Remove guards from unit.
3. Remove the heater cover, exposing both the heater bank and the terminals of the heaters. Note the location of lead and jumper wires.
4. Remove the four bolts on each heater element in the 60, 150, and 450 models. Remove the six bolts on the 1000-1500 model assembly, which includes 3 elements, and remove.
5. Check each heater element individually with an ohmmeter to determine which element burned out.
6. When replacing heater elements, make sure gaskets are good. If gaskets are damaged, replace immediately. Rewire the elements, making sure jumpers are in their correct position. The 60, 150, and 450 models are wired in the parallel wye. The 1000-1500 models is wired in parallel delta.

***Note: Make sure the individual heater element loops are not touching. This will cause a hot spot on the heater and lead to premature heater failure!***

# Chapter 6: Troubleshooting

Problem	Possible Cause	Possible Remedy
Little or no air coming from process.	Dirty air filters.	Clean or replace filters.
Suction in delivery tube.	Phase is reversed on power drop coming into the dryer.	<b>Stop the dryer.</b> If the dryer was connected to the drying hopper, verify that no material has been sucked into the heater can. Change the phase of two legs of the 3-phase power drop. <b>Never change the phase at the motor starters.</b>
Loss or reduction of process air temperature	Process heaters are faulty.	Replace.
	Solid-state temperature control is faulty.	Replace.
	Process temperature was adjusted in error by plant personnel.	Make sure that the plant personnel are aware of the proper temperature set point. A sign posted next to the control would be helpful.
Loss of reduction in drying capacity.	Process heaters are faulty.	Replace
	Change in material being dried from material which was originally specified.	Drying systems are designed for the material which was specified at the time of purchase. Different materials may need longer residence times or higher drying temperatures.
	Break in flex hose to drying hopper.	Inspect for air leaks. Replace if necessary.
Material in drying hopper cakes, or meltdown occurs.	Process temperature set too high due to operator error.	Check plastic data sheet for meltdown temperature. Make sure that plant personnel are aware of the correct process temperature set point.
	Safety set point out of adjustment.	

**-Notes-**

# Chapter 7: Appendix

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## 7-1 Customer Satisfaction Warranty Program

The terms and conditions of the warranty set forth are for one (1) year from the original date of purchase by the original purchaser.

The manufacturer warrants to the original purchaser the product and/or goods to which this disclaimer is attached, and manufactured by us, to be free from defects in material and workmanship under normal use and service. **THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS AND LIABILITIES ON OUR PART.**

This warranty shall not apply to any goods or product manufactured by us which has been subject to accident, negligence, alteration of any kind, abuse, or misuse. We further make no warranty whatsoever in respect to accessories or parts not supplied by us. Any warranty of any nature shall apply only to an "original purchaser" which shall be deemed to mean that person or entity for whom the goods and/or product were originally ordered and installed.

We neither assume nor authorize any person to assume for us any liability in connection with the sale or use of the products and goods sold hereunder, and shall not be responsible for damages for which a purchaser may be liable to other persons, damages to property, or injuries to any other persons.

Our sole obligation under this warranty shall be limited to replacing, repairing, or exchanging any part or parts of goods and/or products sold which we determine are defective under normal use and service within one (1) year of date of installation by the original purchaser. We shall not be liable for any loss or damage resulting directly or indirectly from the use or loss of the goods and/or products purchased. In no event shall we be liable for any general, direct, consequential, incidental, or special damages of any kind.

We do not warrant any of our products that are installed in other machines or apparatus as meeting requirements of any safety code of any nature. The purchaser assumes all risks and liabilities resulting from the installation and use of product sold by us in combination with other machines or apparatus.

We warrant our product to be of the kind and quality quoted, and no other warranty except of title shall be implied. Our company shall repair or replace, at our discretion, any manufactured item on your dryer without charge FOB factory, within one (1) year after date of original purchase, which is proved to be defective when shipped. Claims for labor or consequential damages are not allowed.

Excluded from the above are knives, screens, and belts. Purchased items, including electrical components, motors, etc., shall carry the warranty of the supplier and no extension of that warranty is allowed.

Refer to this manual for assistance in installing and maintaining a highly efficient machine. Questions regarding areas that are not covered in the manual should be referred to the customer service manager at the factory at (800) 229-2919.

## 7-2 Technical Assistance

### ***Parts Department***

Call toll-free 7am–5pm CST [800] 423-3183 or call [630] 595-1060, Fax [630] 475-7005

The ACS Customer Service Group will provide your company with genuine OEM quality parts manufactured to engineering design specifications, which will maximize your equipment's performance and efficiency. To assist in expediting your phone or fax order, please have the model and serial number of your unit when you contact us. A customer replacement parts list is included in this manual for your convenience. ACS welcomes inquiries on all your parts needs and is dedicated to providing excellent customer service.

### ***Service Department***

Call toll-free 8am–5pm CST [800] 233-4819 or call [630] 595-1060

Emergencies after 5pm CST, call [847] 439-5655

We have a qualified service department ready to help. Service contracts are available for most products.

### ***Sales Department***

Call [630] 595-1060 Monday–Friday, 8am–5pm CST

Our products are sold by a worldwide network of independent sales representatives. Contact our Sales Department for the name of the sales representative nearest you.

### ***Contract Department***

Call [630] 595-1060 Monday–Friday, 8am–5pm CST

Let us install your system. The Contract Department offers any or all of these services: project planning; system packages including drawings; equipment, labor, and construction materials; and union or non-union installations.

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